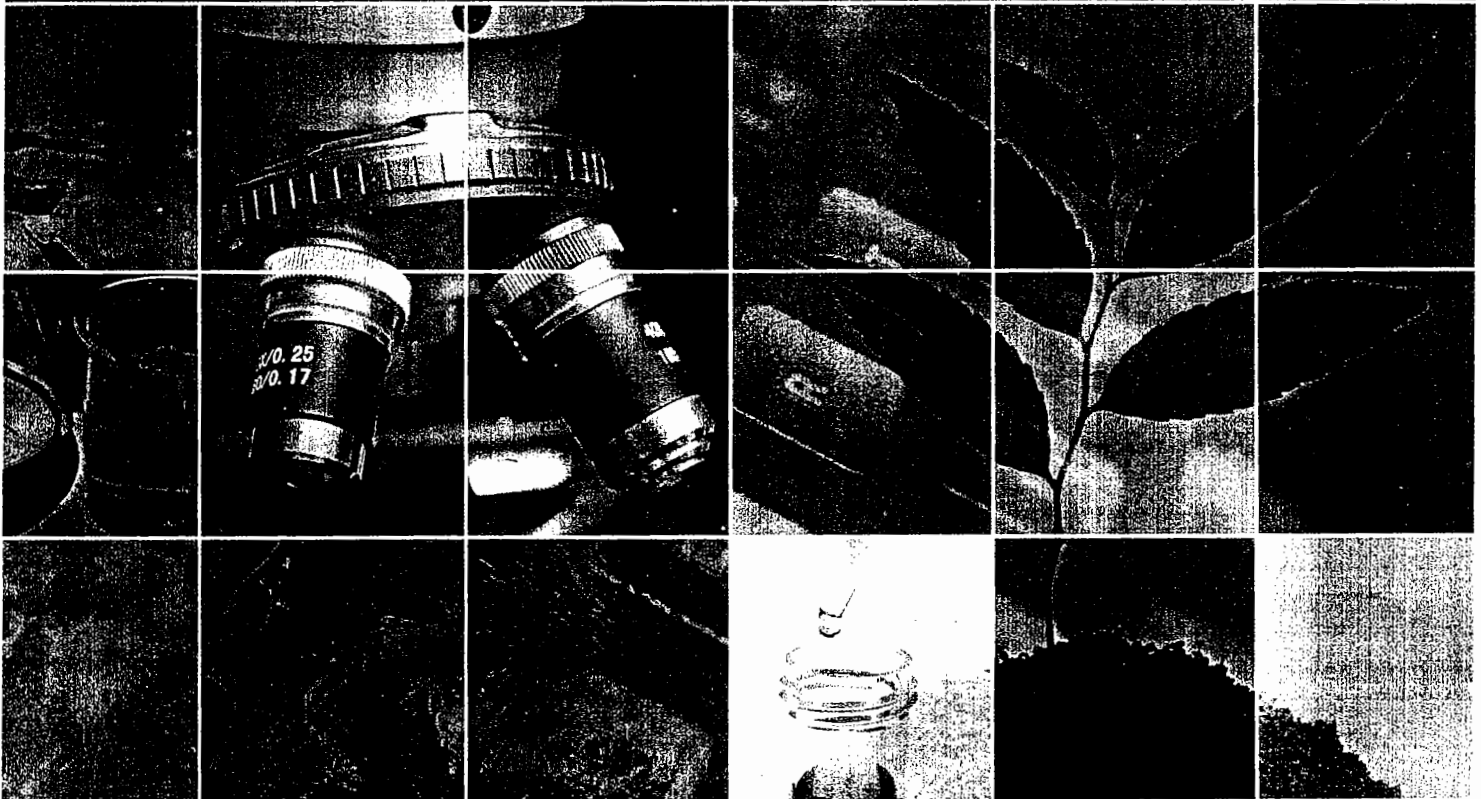


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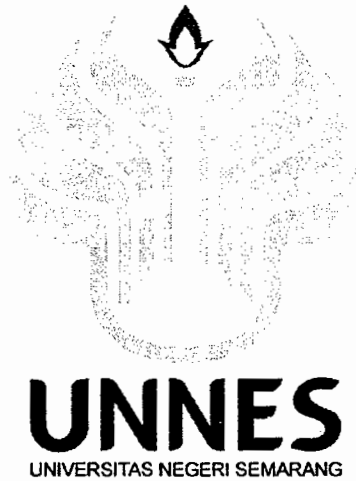


conference
proceedings

1st Unnes International Conference
on Research Inovation and Commercialization (UICRIC) for Better Life 2015

Patra Jasa Hotel Semarang, November 27 - 28th 2015





1st UNNES INTERNATIONAL CONFERENCE

on Research Inovation dan Commercialitation for Better Life 2015

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FOREWORD

First, we would like to express our gratitude to Allah Almighty for His blessings so that this proceeding of the “1ST UNNES International conference on research and commercialization for better life 2015” can be published. These proceedings consist of all papers presented at the conference on 27th-28th November 2015 at Patrajasa Hotel Semarang Central Java Indonesia. The papers were internally reviewed by the qualified reviewers.

The theme of the conference was ” 1ST UNNES International conference on research and commercialization for better life 2015”. It was expected that through this proceeding, we are able to disseminate the results of studies in the field of research.

This event invited seven speakers who presented materials closely related to the theme, namely: (by Prof.Muhammad Nasir), (by Prof. Fathur Rokhman), (by Prof. Prof. Rahim MD.Sail), (by Joop Van De Flier), (by Asst. Prof. Rotchanatach Darnsawasdi), (Prof. Chow Yang lee) and (by Dr.Ayami Nakaya). We hope that this proceeding will be beneficial for the society in terms of education, research, and community services.

Semarang, 26th November 2015

Editorial Board

WELCOMING SPEECH FROM THE COMMITTEE CHAIR PERSON

In order to realize the vision of Semarang State University (UNNES) as the University of Conservation with an international repute, Institute for Research and Community Services (LP2M) establish 1st *UNNES International Conference on Research Innovation and Commercialization (UICRIC) for the better life 2015*. This event aims to increase the number of research publications and improvement of academic atmosphere through improving the quality of research works which we expect to occur downstream of research results to be a product that can be mass produced in an attempt to increase the welfare of society in general. It also aims to increase the capacity of researchers in generating better quality of research proposals in the future.

The scope of the research clusters that will be presented in this international seminar are: Education Innovations, Science and Technology, Quality of Life and Resource Development, Conservation, and the Art, Culture and Humanity.

Chairman of the Committee

Evi Widowati, S.KM., M.Kes.

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4. Dr. Subiyanto, M.Si.
5. J. A. van der Flier
6. Prof. Rahim MD. Sail
7. Asst. Prof. Rotchanatch Darnsawasdi

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Biological Control of *Oryctes rhinoceros* L. (Coleoptera: Scarabaeidae) with Entomopatogen Nematodes

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Abstract — The Coconut production in Jepara, Central Java decreased due *Oryctes rhinoceros* beetle attack, more than 75% plants attacked. Biological control using the entomopatogen nematodes (EPN) has not been done. The aims of the study was conducting efficacy EPN on *O. rhinoceros* larvae on rainy season in the field condition. Biopesticide (Coleonema) containing EPN used for the test. The study used a randomized block design, four treatments and six replications of Biopesticides doses. The first treatment: 1 package biopesticides containing ten million EPN dissolved in 14 liters of water, second treatment 1 package biopesticides dissolved in 7 liters of water, and third treatment 1 package biopesticides dissolved in 3.5 liters of water. One package contains ten million EPN. The black Pot diameter 32 cm and height 25 cm were used for test sites. One pot was given 5 kg of organic soil, ten third instar larvae and 1 liter water containing EPN for each treatment, total 240 larvae. The pot surface covered with a perforated plastic to protect from animals nuisance. Observation was done every week for 8 weeks. The results showed the death of the larvae occurred at third week (2-5%) to eighth week (100%). The experiments carried out on the high rainfall intensity every day. EPN applications on *O. rhinoceros* larvae during the rainy season is not effective because it takes a long time up to 8 weeks.

Keywords—Entomopathogenic (EPN); *Oryctes rhinoceros*; Biological control

INTRODUCTION

Jepara district is one of the cities in Central Java which is located at the edge of the northern coast of Java Sea, consists of 16 districts. One of them was Jeruk Wangi Village which well-known as a producer of coconut. Coconut production in Jeruk Wangi currently declining due to pests attacked coconut beetle (*Oryctes rhinoceros* L.). Farmers do not control this pest, even though the plant attacked has reached 75%.

Oryctes rhinoceros (Coleoptera: Scarabaeidae) or coconut rhinoceros beetle is one of the most important pest of coconut and oil palm in Indonesia (Mulyono 2007). *O. rhinoceros* adults feed in the crown region of coconut and oil palm. They bore through petiole bases into the central unopened leaves. Damaged fronds show typical triangular cuts. The larvae do not damage crops, but instead grow in dead, decaying trunks and other organic matter.

O. rhinoceros control is often neglected, due to several reasons: 1) the coconut plant is not a major food crop so that less attention, 2) the coconut plant generally has a high stem, so it is difficult to control adult of *O. rhinoceros*. 3) the control of larvae also have difficulties because the larvae live

in the soil and the location of the nest is often outside the plantation. So *O. rhinoceros* attacks often known after the pest population was high. Control efforts often use chemical pesticides by farmers in Indonesia.

To limit larval infestation, growers typically incorporate chemical insecticides. However, there is considerable interest in reducing pesticide inputs because of the risk they pose to humans and the environment and increased resistance in pest populations (Ansari et al. 2008). The use of synthetic insecticides causing the death of the natural enemies. Therefore environmental friendly biological control is needed. The agents of biological control are fungi, nematode, virus and bacteria.

There were entomopathogenic nematodes (EPNs) of the families Steinernematidae and Heterorhabditidae can be applied as biocontrol agents. These EPNs have been successfully used against a wide range of soil-inhabiting pests, including black vine weevil, in potted plants and glasshouse crops.

Nematodes are microscopic, nonsegmented worms that occur naturally in soil all around the world. They are parasitic to insect pests that typically have a larval or pupal stage of life in the soil; however, they have been known to also parasitize above ground stages of adults, nymphs and larvae. Once they are released, the nematodes seek out host insects and enter their prey through body openings, injecting them with lethal bacteria (Acosta 2011)

This research was conducted on a coconut plantation owned by the people in the village of Jeruk Wangi, Jepara Central Java, Indonesia. Due to more than 75% Coconut plants attacked by *O. rhinoceros*. The aims of the study was conducting efficacy EPN on *O. rhinoceros* larvae on rainy season in the field condition.

MATERIAL AND METHODS

Species of Entomopathogenic nematodes was *Heterorhabditis* sp, obtained in the form of commercial (Biopesticides), product by faculty of Agriculture, University of Jember. An aluminum pouch packaging containing 10×10^6 EPN, the recommended dose of 1 bag dissolved in 14 liters of water.

Prepared 24 black pot diameter 34 cm, height 22 cm, the bottom of the pot there was a hole for discharge of water. Each pot is filled media sawdust mixture of soil and coconut

trees as much as 5 kg / pot. Each pot contains soil media was mixed with one liter of EPN as prescribed.

Preparation for a solution of EPN: EPN squeezed sponge containing water-squeeze in several time, repeated until the clean sponge. There were four treatment doses of EPN (abbreviated N), namely: 1 pouch packaging EPN was dissolved in 3.5 liters of water (N3,5); 1 pouch packaging EPN dissolved in 7 liters of water (N7); 1 pouch packaging EPN dissolved in 14 liters of water (N14).

Control (K) no EPN just water. Each unit pots were given 10 tails of *O.rhinoceros* larvae 3rd instar, larval size 7-10 cm long and weighing 9-11 grams / larvae. Each unit dose treatment was repeated six times, for a total of 24 pots and 240 larvae. Each pot contains 10 larvae watered as much as 1 liter of water containing the appropriate dose EPN.

O.rhinoceros larvae obtained from the nest in palm plantations in Jeruk Wangi village.

After completion of the perforated plastic surface covered pot (netting) is reasonably safe from animals. Pots and placed in the garden shaded plants. Observations conducted once a week for 8 weeks. Dead larvae were observed in the laboratory to ensure die because EPN or not. Data mortality of larvae were analyzed using descriptive charts mortality progress every week.

RESULTS AND DISCUSSION

O.rhinoceros larval mortality due to EPN for eight weeks is presented in Figure 1 as follows.

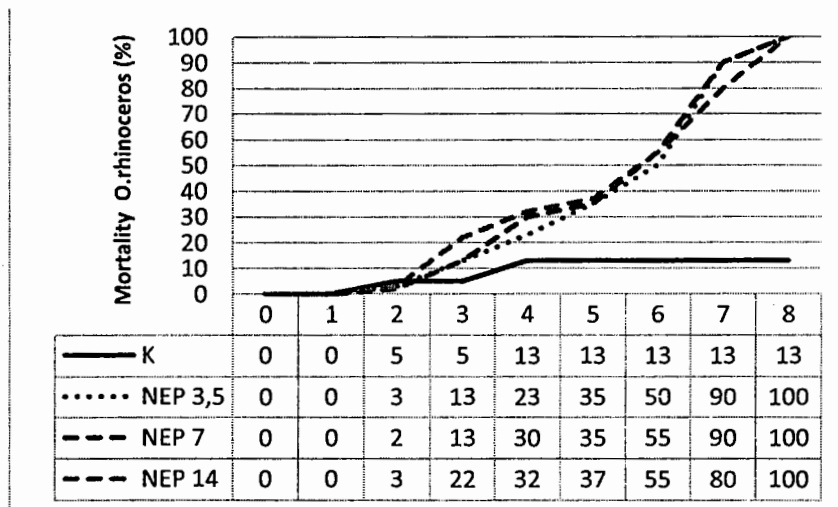


Figure 1. The percentage of *O.rhinoceros* larval mortality due entomopathogenic nematodes (EPN or NEP) treatment: doses of control (K), one package EPN was dissolved in 3.5 liters of water (EPN 3.5); EPN dissolved in 7 liters of water (EPN 7) and EPN dissolved in 7 liters of water (EPN 14). Treatment for eight weeks (average of six replicates).

Figure 1. *O.rhinoceros* larvae died began in the second week (control and treatment). This shows that there were already living microbes before given EPN. This is evident in the control 5% larvae dead, but on 3rd week larval mortality increased. This means that at 2nd - 3rd weeks EPN have infected larvae but not yet dead.

Giving nematodes into soil media, caused percentage of larvae mortality increased. At 7th week the larval mortality increased become (80-90%) while the controls (13%). Giving EPN into soil media increased the natural enemies of insect pests that live in the soil and accelerate death of the larvae (67-77%) (Figure 1).

The data (Figure 1) show that nematodes can kill larvae of the order Coleoptera, it supports the statement Imanandi (2012). However, the mortality of larvae *O.rhinoceros* require a longer time compared with larvae of insects of the order Lepidoptera.

Comparative studies show that nematodes can kill the larvae of *Crocidolomia binotalis* (50.70 hours), *Spodoptera litura* (51.60 hours) (Subagiya 2005).

To kill *O.rhinoceros* larvae with nematodes take a long time, due in this study used 3rd instar which has a hard skin, large larval size. Nematodes will effectively kill the larvae when the larvae enter the body through natural openings, for example through the mouth and holes spiracles. Another possibility is due to weather factors. Application of nematodes in the rainy season was not effective because the nematode dissolve in water before penetrating the larval body. The rains caused the penetration EPN to larvae was fail.

CONCLUSION

Entomopathogen nematodes (EPN) applications on *O.rhinoceros* larvae during the rainy season is not effective because it takes a long time up to 8 weeks until all the larvae die

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Design of Evacuation Maps as A Disaster Preparedness in Trangkil Semarang City

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Abstract — Based on identification result can be seen that in Trangkil is high risk area to get disaster and has not had the emergency response system yet especially on evacuation system. Post-catastrophic landslides in Trangkil make a people who live there develop a division of labor Trangkil disaster response team to tackle the disaster that is going on, but the establishment of a disaster response team personnel are still not complete and it is only made incidentally. Therefore, this research aims is make design of evacuation map, to complete the disaster response team which can be used as guidance for Trangkil community if they want to evacuate themselves when disaster come to this area. This research design is research and development (R & D) with simple design because the research stage only up to the third stage or Main Model Revision of evacuation map, which are constructed by assessment from the key persons in Trangkil area. The research result show that the evacuation map had been developed by the research team through direct observation in the field and interviews with the key persons. Then the initial design which already had been assessed by local community leaders (for 3 people) through interviews process as improvement input of the evacuation map design

Keywords— maps, evacuation, emergency, preparedness.

INTRODUCTION

The evacuation process, especially before the disaster will determine the number of victims and the amount of losses that might occur during catastrophic events. As in the Act of Indonesia number 1, year 1970 Section III Article 3 has been set on the terms of work safety is to prevent, reduce and extinguish fires, prevent and reduce the danger of explosion, as well as provide an opportunity or a way to save themselves at the time of the fire or incident occur.

This evacuation becomes very important because the evacuation process is not easy to do on a community that does not respond to the disaster. As mentioned by Gwynne et al that there are four main factors that determine the performance of the evacuation system, namely: configuration/arrangement of land that existed at the housing, factors environmental conditions, reliability of the evacuation procedures were applied, and the most important is the behavior of its inhabitants. Because of the behavior/nature of the occupants is affected by the physical condition, psikhis and sociological.

Indonesia is a country prone to disasters ranging from fires, earthquakes, bombings, floods, volcanic eruptions, landslides and so forth. The incidence of landslides also occurred in Trangkil Semarang. Wherein based on the identification of potential risks can be seen that in Trangkil which is a disaster-prone areas do not have a disaster response system including an adequate evacuation system

especially evacuation maps that can provide guidance for local residents to evacuate themselves when disaster comes. Post-landslide that occurred in Trangkil only made public Trangkil division of labor set up a disaster response team but the determination of the emergency response team personnel are still not accurate and complete, and the team there is still a very incidental. And do not have a comprehensive design-related emergency response system especially mapmaking evacuation.

Formulation of the problem

Based on this background, it can be formulated the problem in this research is: "How does the design of evacuation maps that can be used as a disaster response efforts in Trangkil Semarang?"

Research purposes

The aim of this study is to develop a map of the evacuation as disaster response efforts in Trangkil Semarang.

Benefits of research

This research could provide theoretical benefits that can enrich the scientific field of Occupational Health and Safety (OHS), particularly at the Semarang State University in the form of related references evacuation systems within the community, especially design of evacuation maps. Moreover, it can provide a practical contribution directly to the public in the form of Semarang Trangkil draft evacuation maps that can be used when the disaster come in that area.

Theoretical Overview

Evacuation is the rescue of the human soul from one room or building to another place safer in emergencies situation. In addition evacuation also be understood as an attempt to rescue the soul in the fire disaster. Evacuation facilities, consisting of:

1) Assembly point

assembly point is a safe place. Personnel who are not directly involved in dealing with emergencies immediately evacuated from the site toward a safe gathering place.

An assembly point should be clearly marked and equipped with communication devices such as: telephone and radio with an emergency control center. This meeting place should be more than one so that workers are